Science Data Segment (SDS)

More Background

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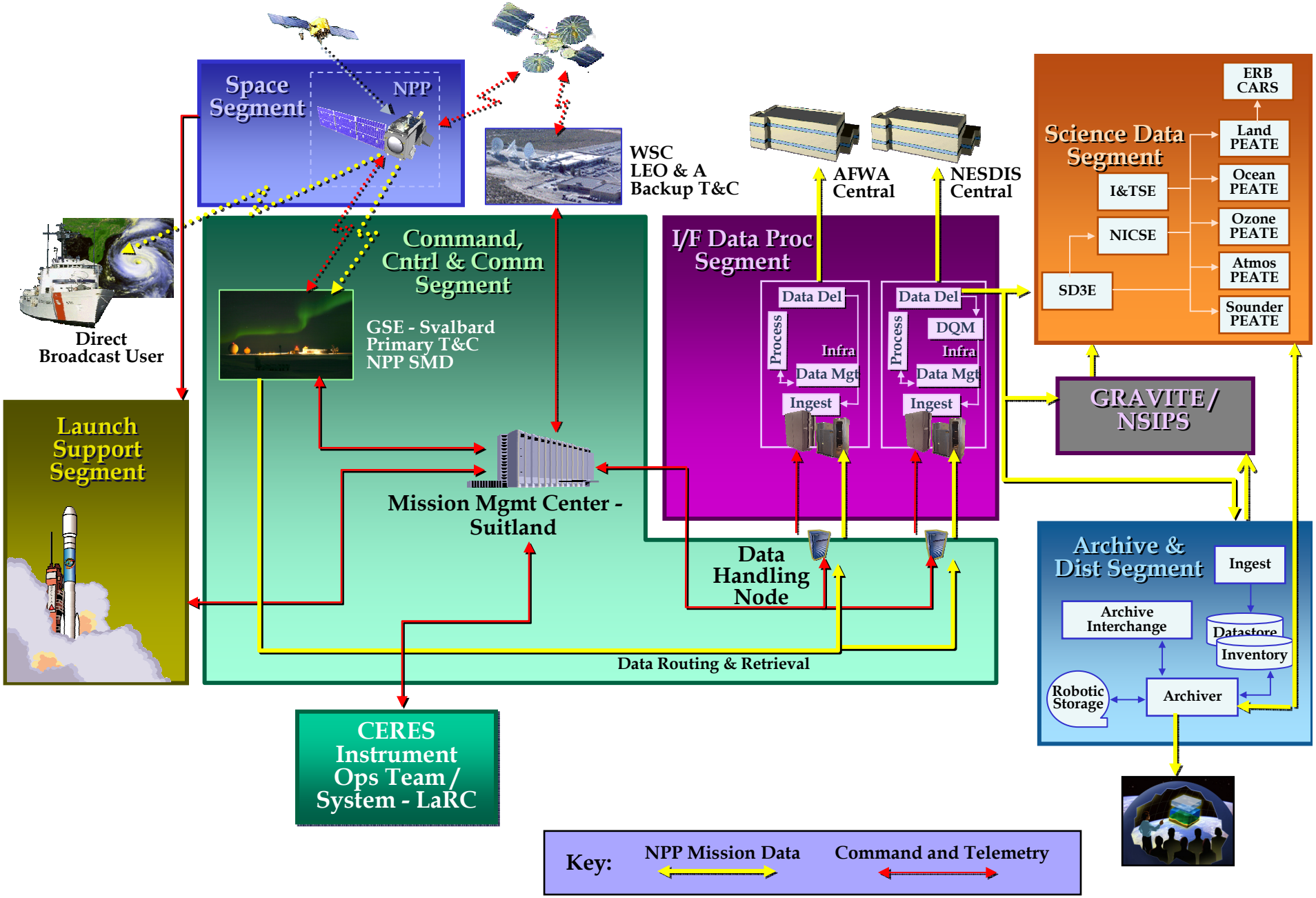
NASA/GSFC

NPP Mission System Architecture

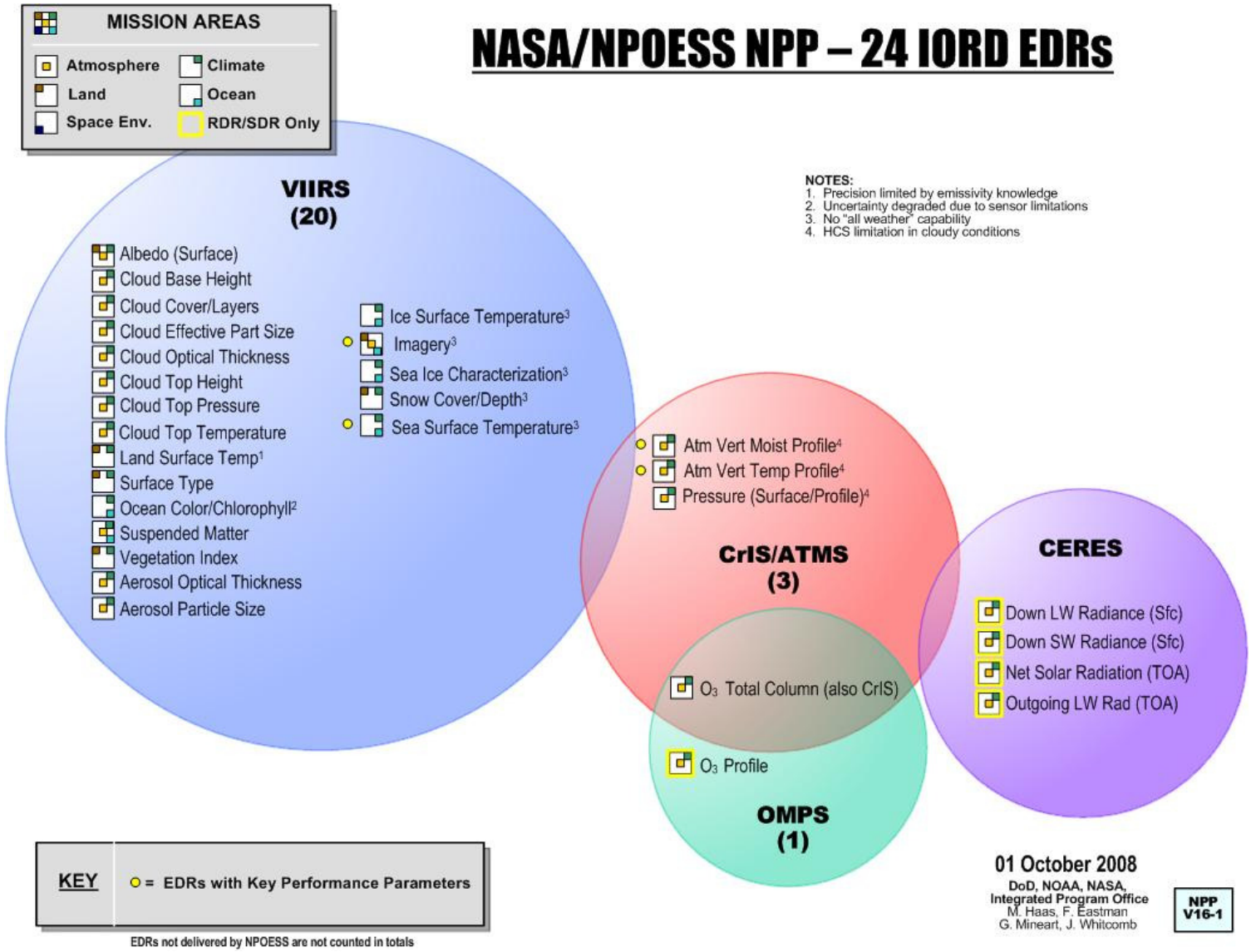


SDS Purpose

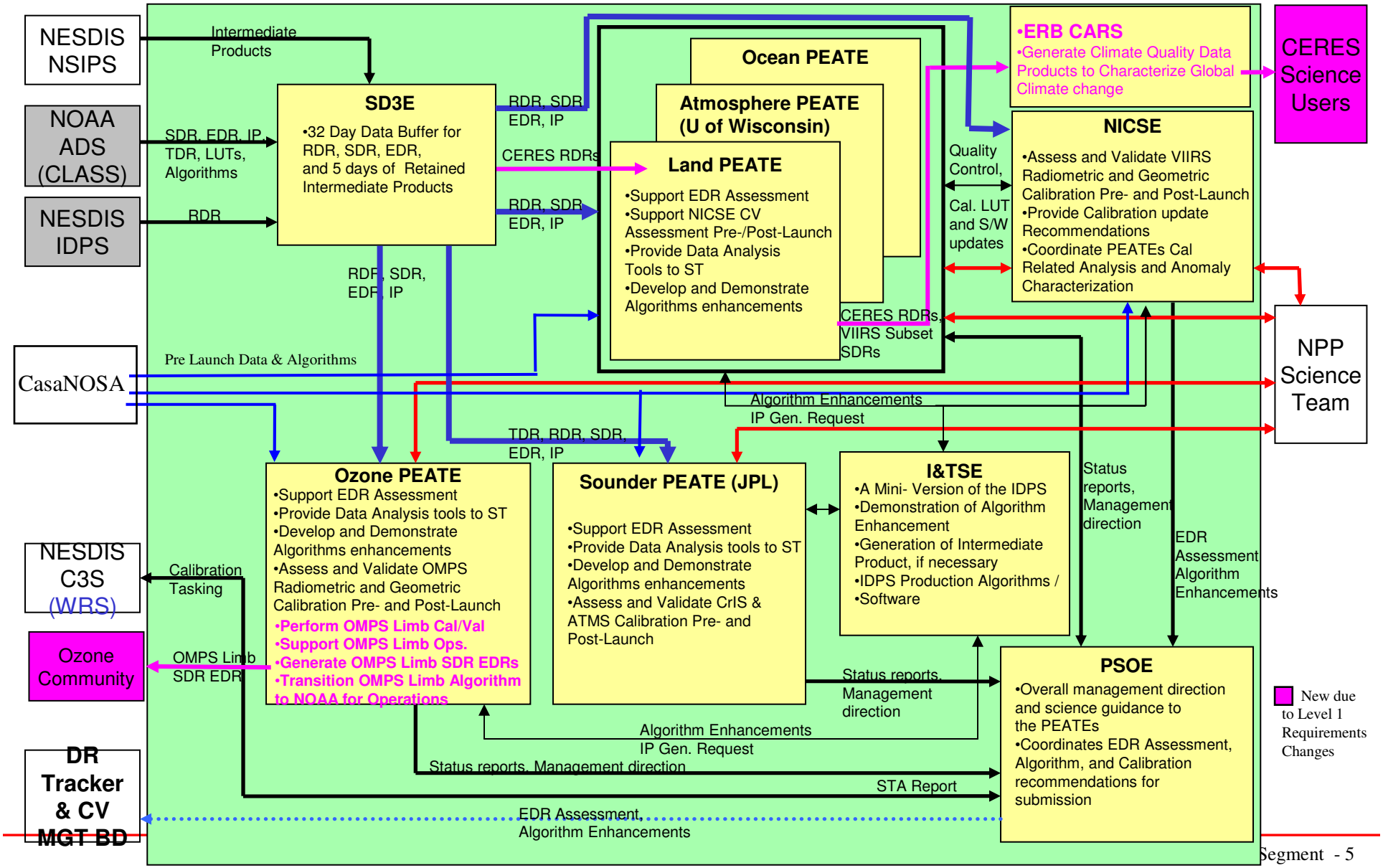
- ***The NPP Science Data Segment is a System of Systems distributed amongst: 9 facilities located at GSFC, JPL, U of Wisconsin, & LaRC***
- ***The SDS is responsible for:***
  - ***Serving as a prototype element for the future NASA Earth Science Enterprise (ESE) science data systems***
  - ***Assessing NPP Environmental Data Records (EDRs) for climate quality suitability***
  - ***Providing & Demonstrating SDR & EDR algorithm improvements / enhancements***
  - ***Supporting Calibration / Validation Activities in processing selected data***
  - ***Producing Research OMPS Limb SDR & EDR, performing OMPS Limb Instrument Calibration Management, & Instrument commanding***
  - ***Producing climate quality data records for characterization of global climate change***

SDS Supports the NPP Science Team Members as a Research Tool

NPP EDRs


MISSION AREAS
Atmosphere
Climate
Land
Ocean
Space Env.
RDR/SDR Only
NASA/NPOESS NPP – 24 IORD EDRs
NOTES:
1. Precision limited by emissivity knowledge
2. Uncertainty degraded due to sensor limitations
3. No "all weather" capability
4. HCS limitation in cloudy conditions
VIIRS
(20)
Albedo (Surface)
Cloud Base Height
Cloud Cover/Layers
Cloud Effective Part Size
Cloud Optical Thickness
Cloud Top Height
Cloud Top Pressure
Cloud Top Temperature
Land Surface Temp[1]
Surface Type
Ocean Color/Chlorophyll[2]
Suspended Matter
Vegetation Index
Aerosol Optical Thickness
Aerosol Particle Size
Ice Surface Temperature[3]
Imagery[3]
Sea Ice Characterization[3]
Snow Cover/Depth[3]
Sea Surface Temperature[3]
Atm Vert Moist Profile[4]
Atm Vert Temp Profile[4]
Pressure (Surface/Profile)[4]
CrIS/ATMS
(3)
O3 Total Column (also CrIS)
O3 Profile
OMPS
(1)
CERES
Down LW Radiance (Sfc)
Down SW Radiance (Sfc)
Net Solar Radiation (TOA)
Outgoing LW Rad (TOA)
KEY
= EDRs with Key Performance Parameters
EDRs not delivered by NPOESS are not counted in totals
01 October 2008
DoD, NOAA, NASA,
Integrated Program Office
M. Haas, F. Eastman
G. Mineart, J. Whitcomb
NPP
V16-1

SDS Logical Block Diagram (1 of 3)



Not all data flows shown here.

SDS Logical Block Diagram (2 of 3)

- ***SDS Data Delivery & Depository Element (SD3E), NASA GSFC Code 586/614***
  - ***In-House development effort. Some software reuse from MODAPS. Provides ~32 days "rolling storage" for pick-up by PEATEs and the NICSE. Serves as front-end between the providers, ADS/CLASS, IDPS, & NSIPS, and the SDS Elements***
- ***Land Product Evaluation Analysis Tool Element (PEATE), NASA GSFC Code 614***
  - ***Developing & integrating NPPDAPS by reusing MODIS Adaptive Processing System (MODAPS) and integrating with the* Level 1 Atmosphere Archive and Distribution System (LAADS)**
- ***Atmosphere PEATE, University of Wisconsin-Madison***
  - ***Developed & integrated SPS for data staging, data management, and algorithm rules application***
- ***Ocean PEATE Climate Analysis Research System, NASA GSFC Code 614***
  - ***Added System Capacity to existing Ocean Data Processing System (ODPS). Requires I&TSE for EDR Production Algorithm analysis***
- ***Ozone PEATE, NASA GSFC Code 614***
  - ***Adding capacity to Atmospheric Composition Processing System (ACPS), formerly known as OMIDAPS to capture Ozone xDRs for analysis and evaluation***
  - ***Recently allocated requirements for Producing Research OMPS Limb SDR & EDR, performing OMPS Limb Instrument Calibration Management, & Instrument commanding***

SDS Logical Block Diagram (3 of 3)

- ***Sounder PEATE, NASA JPL, Pasadena, CA***
  - ***Adding capacity to the Atmospheric Infrared Sounder (AIRS) Project's Team Leader Science Computing Facility (TLSCF) for assessing climate quality of Atmospheric EDRs. Also assess and validates CrIS and ATMS Calibration.***
- ***Earth Radiation Budget Climate Analysis Research System (ERB CARS) NASA LaRC***
  - ***Leverages existing processing capabilities and human resources across the Atmospheric Science Data Center (ASDC), CERES Science Group, and the Data Management Group at the NASA Langley Research Center for characterization of Global Climate Change & Climate Data Record Production***
- ***Integration and Test System Element (I&TSE) NASA GSFC Code 586/614***
  - ***A smaller scale clone of the production IDPS System. Affords PEATES ability to: analyze production algorithms, trouble shoot processing chains, regenerate Intermediate products and to demonstrate algorithm enhancements and / or calibration improvements***
- ***NPP Instrument Calibration Support Element (NICSE) NASA GSFC Code 614***
  - ***Leverages MODIS Calibration Support Team and NPP/VIIRS Instrument Calibration Science Teams for the assessment and characterization of the radiometric and geometric performance of the VIIRS Instrument***
- ***PSOE - Project Science Office Element NASA GSFC Code 613.3***
  - ***Tool to be used by the NPP Project Scientist. Coordinates data analysis priorities, algorithm enhancement, Look Up Table (LUT), and calibration coefficient changes with PEATES/NICSE. Web based open source tools to track requests, generate notifications, and data issues. Used to submit algorithm and calibration recommendations to NPP/NPOESS Algorithm Configuration Control Board.***

SDS PEATE to Science Teams

Project Scientist

Earth Radiation Budget Measurement Team

Don Anderson *NASA/HQ*
Bruce Wielicki (PI)
Norman Loeb (PI)
Kory Priestly
Pat Minnis
Dave Kratz
Tom Charlock
Dave Doelling + ~15 others

ERB CARS
- Produces Earth Radiation Budget CDRs

Sounder IR/uwave Measurement Team

Ramesh Kakar:NASA/HQ
Goldberg, Mitchell
Aumann, George
Revercomb, Henry
Lambrigtsen, Bjorn
Blackwell, William
Strow, Larrabee

Sounder PEATE
- Ingest and validate xDRs
- Support Climate Research

Ozone Measurement Team

Ken Jucks:NASA/HQ
McPeters, Richard
Rault, Didier
Chance, Kelly

Ozone PEATE
- Ingest and validate xDRs
- Support Climate Research

Clouds/Aerosol Measurement Team

Hal Maring: NASA/HQ
Baum, Bryan
Menzel, Paul
Hsu, Christina
Torres, Omar
Andy Heidinger
Steve Platnick,
Hank Revercomb,

Atmosphere PEATE
- Ingest and validate xDRs
- Support Climate Research

Land Measurement Team

Diane Wickland:NASA/HQ
Wolfe, Robert
Wan, Zenming
Huete, Alfrdo
Lyapustin, Alexei
Csiszar, Ivan
Friedl, Mark
Schaaf, Crystal
Myneni, Ranga
Justice, Christopher

LAND PEATE
- Ingest and validate xDRs
- Support Climate Research

Ocean Measurement Team

Paula Bontempi:NASA/HQ
McClain, Charles
Wang, Menghua
Behrenfeld, Michael
Minnett, Peter
Evans, Robert, + 7 others

Ocean PEATE (CARS)
- Ingest and validate xDRs
- Support Climate Research

Roles and Responsibilities
Science Team / PEATE Generic

Science Team	PEATE
Perform simulations & studies with algorithms	**Integrate, wrap, or port, NPP Production Algorithms**
Compare performance of production algorithms with that of heritage algorithms.	**Integrate heritage algorithms as requested by Science Team**
Design / Direct Software tools needed (e.g., software to evaluate SDR.)	**Stage heritage data as needed**
Validate results, suggest calibration adjustments, & algorithm improvements	**Implement & demonstrate improved algorithms**
Coordinate and Provide feedback to Project Scientist	**Interface with SD3E, ADS/CLASS, I&TSE, & C3S Extranet server as needed.**
	Implement xDR Acquisition, Cataloging, and Management
	Implement/Adapt Product Evaluation Software